Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN J. FRANTZEN

Appeal No. 2001-1939
Application No. 09/072,605

ON BRIEF

Before ABRAMS, FRANKFORT, and STAAB, Administrative Patent Judges.

ABRAMS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1, 2, 7 and 9-23, which are all of the claims pending in this application.[1]

We AFFIRM-IN-PART.

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[1]Claim 9 was amended after the final rejection.

BACKGROUND

The appellant's invention relates to a method for polishing surfaces of a surgical stent. An understanding of the invention can be derived from a reading of exemplary claim 1, which has been reproduced below.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Suzuki et al. (Suzuki)	4,319,435	Mar. 16, 1982
Sawyer	5,108,417	Apr. 28, 1992
Frantzen	5,746,691	May 5, 1998
Klein	5,788,558	Aug. 4, 1998

Claims 1, 2, 7 and 10 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 5,746,691 in view of Suzuki.

Claims 14, 18, 19 and 21 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Klein.

Claims 14, 18, 19 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Klein in view of Sawyer.

Claims 15 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Klein in view of Sawyer.

Claims 1, 2, 7, 9, 10, 11, 16, 17 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Klein in view of Suzuki.

Claims 12, 13 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Klein in view of Suzuki and Sawyer.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the Answer (Paper No. 14) for the examiner's complete reasoning in support of the rejections, and to the Brief (Paper No. 13) and Reply Brief (Paper No. 15) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

Claim 1

> A method for polishing surfaces of a cylindrical radially expandable surgical stent including the steps of:
>
> selecting an abrasiveness for particles within a fluid abrasive media;
>
> providing a source of the fluid abrasive media;
>
> orienting the radially expandable surgical stent with a central axis thereof extending in an axial direction;
>
> subjecting the fluid abrasive media to elevated pressure substantially between 300 and 800 p.s.i.; and

> flowing the abrasive media past the radially expandable surgical stent in an axial direction with the abrasive media coming into physical contact with the surfaces of the radially expandable surgical stent.

The Double Patenting Rejection

It is the examiner's view that all of the subject matter recited in claim 1 is finds correspondence in claims 1-5 of Frantzen except for the step of subjecting the abrasive fluid media to an elevated pressure of between 300 and 800 psi. However, according to the examiner, Suzuki teaches subjecting a workpiece to blasting with abrasive media at a pressure of 450 psi, which falls within the claimed range, and it would have been obvious to utilize this pressure in the Frantzen method. The appellant argues in reply that Suzuki is directed to "blasting," which is different from "polishing," and that one of ordinary skill in the art of manufacturing fragile items such as medical stents would not seek to utilize the teachings of Suzuki because they would be destructive of the stent (Brief, pages 4 and 5; Reply Brief, pages 1 and 2). As support for this position, the appellant has submitted excerpts from a technical dictionary stating that "blasting" means cleaning materials by a blast of air that blows small abrasive particles against the surface, and "polishing" means smoothing and brightening a surface such as a metal or rock through the use of abrasive materials (appendix to Reply Brief).

The Frantzen claims are directed to a method for polishing surfaces of a cylindrical radially expandable stent. Claim 5 includes the step of "pressurizing the abrasive media to a pressure above atmospheric pressure" while it flows past the stent,

but does not specify the pressure or a range thereof. Applying the definition of "polishing" provided by the appellant, one of ordinary skill in the art would understand that the inventive method recited in Frantzen's claim 5 is for the purpose of "smoothing and brightening" the surface of the stent.

Suzuki is directed to removing burrs from a workpiece, that is, removing thin ridges or areas of roughness produced in cutting or shaping metal areas,[2] by impacting the workpiece with a pressurized stream of abrasive particle-water slurry. Suzuki teaches that 450 psi is an effective pressure for performing this operation. From our perspective, deburring falls within the definition of "polishing" since, in the absence of evidence to the contrary, the effect of removing the roughness produced in cutting or shaping the metal by the action of the abrasive stream upon the surfaces of the workpiece would make them smoother and brighter than they were prior thereto. Since radially expandable surgical stents are formed of metal, we agree with the examiner that one of ordinary skill in the art would have found it obvious to utilize Suzuki's suggested pressure of 450 psi in the Frantzen system, suggestion being found in Suzuki's explicit teaching that this would remove ridges and areas of roughness resulting from shaping processes.

[2]See, for example, the definition of burrs in Webster's New Collegiate Dictionary, 1973, page 148.

Moreover, the artisan is presumed to have skill, rather than the lack thereof,[3] and once having been taught by Frantzen that the surfaces of a surgical stent can be polished by subjecting it to abrasive media at a pressure above atmospheric pressure, could be expected to determine whether a particular level of pressure would be applicable to a particular workpiece, be it more or less delicate. It is our view that the pressure utilized to impact the abrasive against the stent in the Frantzen method recited in claim 5 thus would have been considered by one of ordinary skill in the art to be a result-effective variable, in that it would have more or less effect upon the surface thereof and could inflict damage thereon, and optimization of a variable recognized in the art as a result-effective variable normally is considered to be within the skill of the art. In re Antonie, 559 F.2d 618, 62, 195 USPQ 6, 8 (CCPA 1977).

We do not agree with the appellant that Suzuki constitutes nonanalogous art. The test for analogous art is first whether the art is within the field of the inventor's endeavor and, if not, whether it is reasonably pertinent to the problem with which the inventor was involved. See In re Wood, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979). A reference is reasonably pertinent if, even though it may be in a different field of endeavor, it logically would have commended itself to an inventor's attention in considering his problem because of the matter with which it deals. See In re Clay, 966 F.2d 656, 659, 23 USPQ2d 1058, 1061 (Fed. Cir. 1992). It is our view

[3] In re Sovish, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985).

that, at the very least, Suzuki would have commended itself to the attention of one of ordinary skill in the art who is attempting to solve the problem of polishing the surface of a surgical stent in view of the fact that it is directed to smoothing the surface of a workpiece. With regard to the argument that the only suggestion to combine the teachings of Suzuki with those of Frantzen is found in hindsight, we wish to note that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See In re McLaughlin, 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971). It is our opinion that proper suggestion to combine exists in this case.

On the basis of the reasoning set forth above, we conclude that the subject matter recited in claim 1 would have been obvious in view of claims 1-5 of Frantzen and the teachings of Suzuki, and we will sustain the obviousness-type double patenting rejection of claim 1 of the present application. Since the appellant has grouped claims 2, 7 and 10 with independent claim 1, from which they depend, they fall therewith.

The Rejection Under Section 102

Claims 14, 18, 19 and 20 stand rejected as being anticipated by Klein. Anticipation under 35 U.S.C. § 102 is established only when a single prior art reference

discloses, either expressly or under the principles of inherency, each and every element of the claimed invention. See, for example, In re Paulsen, 30 F.3d 1475, 1480-1481, 31 USPQ2d 1671, 1675 (Fed. Cir. 1994).

Claim 14 is directed to a method of polishing surfaces of a surgical stent comprising the steps of providing a source of fluid abrasive media, flowing the abrasive media in an axial direction and maintaining the flow past an inner stent surface for a length of time "sufficient to abrade the edges of the inner stent surface until said edges are streamlined in shape." At this juncture, we should point out that the common definition of "streamlined" is "contoured to reduce resistance to motion through a fluid (as air)."[4]

The Klein patent discloses an apparatus and method for polishing stents by flowing an abrasive slurry through the stent. It provides a source of fluid abrasive media and flows it past the stent in an axial direction with the media coming into contact with the surfaces of the stent. In the course of the disclosed polishing method the abrasive particles "round edges and corners" (column 4, line 28). As is explained in column 9, lines 19-65, "[t]he method for polishing the surfaces 28, 29, 32 and deburring and rounding edges 34, 36 of stent 2" (emphasis added) is accomplished by holding the stent in a passage in a fixture and causing abrasive material to flow axially past the inner and outer surfaces of the stent as well as to be extruded through the openings in

[4]See, for example, Webster's New Collegiate Dictionary, 1973, page 1151.

the side walls of the stent. With reference to Figure 2, it can be seen that rounding edges 34 and 36 will result in contouring them, which clearly will reduce resistance to motion through a fluid as compared to the perpendicular shape of the corners prior to such treatment, that is, streamline the flow. Thus, Klein flows the abrasive past the inner surfaces of the stent for a length of time sufficient to abrade the edges of the inner stent surface until the edges are rounded and thus are "streamlined", as is required by claim 14.

While we have carefully considered the arguments offered by the appellant with regard to this rejection, they have failed to persuade us that the rejection should not be sustained, for they are based on a definition of streamlined which is more restrictive than the common definition. In this regard, we note that the appellant has explained in the specification that the prior art was "not sufficiently streamlined" (page 3) while his invention is "extensively streamlined" (page 6), which lends credence to our position that "streamlined" is a broad term that includes rounding the edges.

The Section 102 rejection of claim 14 is sustained, as is the like rejection of dependent claims 19 and 21, the separate patentability of which were not argued.

The patentability of claim 18 has been argued. Claim 18 adds to claim 14 the requirement that the fluid abrasive media "contains particles having a size substantially between 0.008 and 0.0003 inches." Klein discloses that "[t]ypically, abrasive particle size ranges from 0.005 mm to 1.5 mm" (column 9, lines 10 and 11), which is between

0.06 and 0.0002 inches. The Klein range encompasses the claimed range, and thus clearly "contains" particles that are within the claimed range, which is all that claim 18 requires. The Section 102 rejection of claim 18 also is sustained.

The Rejections Under Section 103

The initial burden of establishing a basis for denying patentability to a claimed invention rests upon the examiner. See In re Piasecki. 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The question under 35 U.S.C. §103 is not merely what the references expressly teach but what they would have suggested to one of ordinary skill in the art at the time the invention was made. See Merck & Co. v. Biotech Labs., Inc. 874 F.2d 804, 807, 10 USPQ2d 1843, 1846 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989) and In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). While there must be some suggestion or motivation for one of ordinary skill in the art to combine the teachings of references, it is not necessary that such be found within the four corners of the references themselves; a conclusion of obviousness may be made from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference. See In re Bozak, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969). Further, in an obviousness assessment, skill is presumed on the part of the artisan, rather than the lack thereof. In re Sovish, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985). Insofar as the references themselves are concerned, we are bound to consider the

disclosure of each for what it fairly teaches one of ordinary skill in the art, including not only the specific teachings, but also the inferences which one of ordinary skill in the art would reasonably have been expected to draw therefrom. See In re Boe, 355 F.2d 961, 965, 148 USPQ 507, 510 (CCPA 1966) and In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968).

The Rejections On The Basis Of Klein And Sawyer

The first of these rejections is that, as an alternative to the rejection of being anticipated by Klein, claims 14, 18, 19 and 21 are unpatentable over Klein in view of Sawyer. We have discussed Klein above, the result being that we agreed with the examiner that these claims were anticipated by Klein (the appellant argued the separate patentability only of dependent claim 18). On the basis that anticipation is the epitome of obviousness (In re Fracalossi, 681 F.2d 792, 794, 215 USPQ 569, 571 (CCPA 1982), the Section 103 rejection of claims 14, 18, 19 and 21 also can be sustained, with Sawyer being considered to be merely confirmatory of the position we took in Klein regarding "streamlined)." In this regard, Sawyer seeks to reduce turbulent flow through a stent, and does so by providing the inner surface of the stent with an "airfoil" configuration (column 4, lines 2-13; column 5, line 17) which, as shown in Figure 2, includes rounding corners of the segments that comprise the stent, a result that also is accomplished by practicing the Klein abrading process.

Also rejected on the basis of Klein and Sawyer are dependent claims 15 and 22. Claim 15 adds to claim 14 the requirement that the flow of abrasive media past an outer stent surface be maintained for a time "sufficient only to polish the outer stent surface." Since claim 14 requires that the abrasive be flowed until the edges of the inner stent surface are streamlined, we interpret claim 15 to mean that the time sufficient to polish the outer stent surface is less than that required to streamline the inner tent surface. In any event, the examiner admits Klein does not streamline the edges of the inner stent surface while only polishing the outer stent surface, and looks to Sawyer for this teaching. However, while Sawyer does disclose streamlining the inner stent surfaces, it is accomplished by bending, cold forming or machining (column 5, lines 17-20). It is our view that the combined teachings of the two references would not have suggested to one of ordinary skill in the art that the edges of the inner stent surfaces be exposed to flowing abrasive media until the corners of the edges are streamlined while the outer stent surfaces are exposed "only" until they are polished. Therefore, a prima facie case of obviousness has not been established by the teachings of Klein and Sawyer with regard to the subject matter of claim 15, and we will not sustain the rejection.

Claim 22 adds to claim 14 the requirement that the flowing step include maintaining the flowing "for a length of time sufficient to abrade the edges of the inner stent surface until said edges have a greater radii of curvature than radii of the outer edges bordering an outer surface of the stent." There is no teaching in either of the

applied references that the inner surface edges should be abraded more than the outer ones. This being the case, we will not sustain the rejection of claim 22.

The Rejection On The Basis Of Klein And Suzuki

This rejection is directed to claims 1, 2, 7, 9, 11, 16, 17 and 20. It is the examiner's position that Klein discloses all of the subject matter recited in independent claim 1 except for disclosing a specific pressure for the abrasive media (between 300 and 800 psi), but that Suzuki's disclosure of 450 psi would have suggested to one of ordinary skill in the art that this is suitable for use in the Klein method, thus rendering the claim obvious. The appellant argues that Klein teaches away from the method recited in claim 1, and that no suggestion exists for combining the teachings of the references in the manner proposed by the examiner.

Klein was discussed above with regard to claim 14, and Suzuki with regard to the double patenting rejection. We shall sustain this rejection of claim 1 on the basis of essentially the same reasoning as we applied above with regard to the double patenting rejection. To reiterate, the Klein method polishes the surfaces of a stent by extruding an abrasive slurry through the stent in an axial direction with the media coming into contact with the inner and outer surfaces of the stent, as well as flowing perpendicularly through the openings in the stent (column 1, lines 8 and 9). The abrasive material is under pressure (column 6, lines 64 and 65), but the level of pressure is not disclosed. We agree with the examiner that Klein discloses all of the subject matter recited in claim 1

except for the recited range of pressure. Suzuki teaches that areas of roughness can be removed from workpieces by a stream of abrasive particle water slurry at 450 psi. As was the case above, we agree with the examiner that one of ordinary skill in the art would have found it obvious to utilize Suzuki's suggested pressure of 450 psi in the Klein system. In addition, we again point out that one of ordinary skill in the art would have known that the amount of pressure used would be a result effective variable, that is, too much pressure would damage a stent, and would have optimized the pressure to accomplish the desired task. See In re Antonie, supra.

The like rejection of dependent claims 2, 7 and 10 also is sustained in view of the fact that they were grouped with claim 1 (Brief, page 4). The separate patentability having not been argued, the rejection of claims 9, 11, 16, 17 and 20 over Klein in view of Suzuki also is sustained.

The Rejection On The Basis Of Klein, Suzuki And Sawyer

This rejection is directed to claims 12, 13 and 23. Claim 12 adds to claim 1 the limitation that the abrasive media is flowed past the stent for a length of time sufficient to abrade the edges of the inner stent surface until they are streamlined in shape, and past the outer stent surface "only" until this surface is polished. We concluded above with regard to claim 22 that this limitation was not rendered obvious by the teachings of Klein and Sawyer. Further consideration of Suzuki does not alter this decision, and we therefore will not sustain the rejection of claim 12.

We reach the same conclusion with regard to the step added to claim 1 by dependent claim 13 concerning the differing radii of the inner and outer surface edges of the stent, for Suzuki does not overcome the deficiencies set out above with regard to Klein and Sawyer.

Independent claim 23 recites, *inter alia*, the limitations regarding streamlining the edges of the inner stent surfaces while only polishing the outer stent surfaces. For the reasons cited against claims 12 and 15, we also will not sustain the rejection of claim 23.

SUMMARY

The rejection of claims 1, 2, 7 and 10 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 5,746,691 in view of Suzuki is sustained.

The rejection of claims 14, 18, 19 and 21 under 35 U.S.C. § 102(e) as being anticipated by Klein is sustained.

The rejection of claims 14, 18, 19 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Klein in view of Sawyer is sustained.

The rejection of claims 15 and 22 under 35 U.S.C. § 103(a) as being unpatentable over Klein in view of Sawyer is not sustained.

The rejection of claims 1, 2, 7, 9, 10, 11, 16, 17 and 20 under 35 U.S.C. § 103(a) as being unpatentable over Klein in view of Suzuki is sustained.

The rejection of claims 12, 13 and 23 under 35 U.S.C. § 103(a) as being unpatentable over Klein in view of Suzuki and Sawyer is not sustained.

The decision of the examiner is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

NEAL E. ABRAMS Administrative Patent Judge	)
CHARLES E. FRANKFORT Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
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APPEAL NO. 2001-1939 - JUDGE ABRAMS
APPLICATION NO. 09/072,605

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APJ STAAB

APJ FRANKFORT

DECISION: **AFFIRMED-IN-PART**

Prepared By: LESLEY BROOKS

GAU: 3700

DRAFT TYPED: 31 Jul 03

FINAL TYPED: